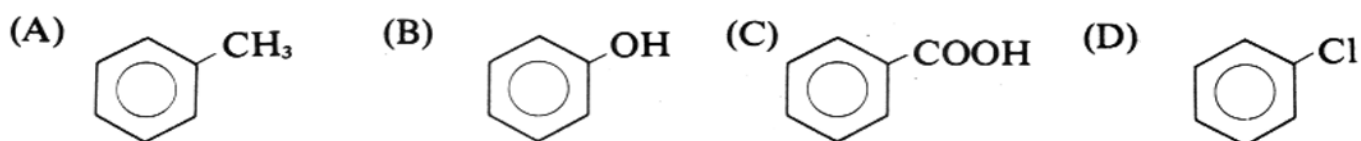


Self Test 9

Organic Chemistry

Select the best answer and write its letter in the space at the right.

1. Which compound is a hydrocarbon?



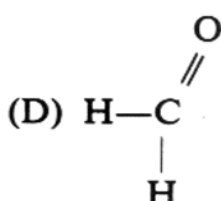
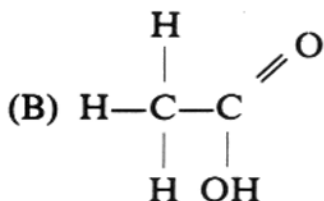
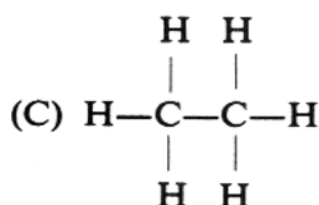
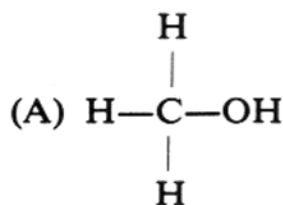
1. _____

2. A molecule of which alcohol contains more than one hydroxyl group?

(A) propanol (B) butanol (C) pentanol (D) glycerol

2. _____

3. Which is an example of an organic acid?



3. _____

4. What could be the name of a compound that has the general formula $\text{R}-\text{OH}$?

(A) methanol (C) methyl methanoate
(B) methane (D) methanoic acid

4. _____

5. An organic compound with the formula $\text{C}_3\text{H}_7\text{OH}$ should be classified as

(A) a base (B) an acid (C) an alcohol (D) an aldehyde

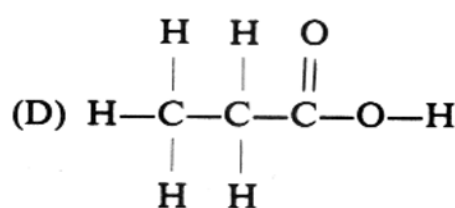
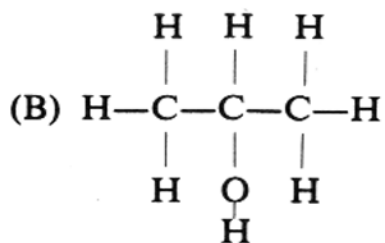
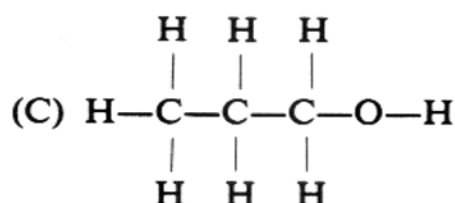
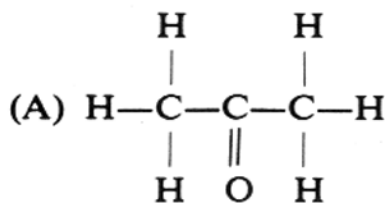
5. _____

6. An organic compound whose water solution turns litmus red is

(A) CH_3OH (C) CH_3COOH
(B) C_6H_{12} (D) $\text{C}_6\text{H}_{12}\text{O}_6$

6. _____

7. Which structural formula represents a primary alcohol?



7. _____

8. Which formula represents an organic acid?

- (A) CH_3COOH (C) CH_3OCH_3
(B) CH_3OH (D) $\text{CH}_3\text{COOCH}_3$

8. _____

9. A solution of methanol differs from a solution of acetic acid in that the solution of acetic acid

- (A) contains molecules only (C) turns red litmus to blue
(B) has a pH of 7 (D) conducts electricity

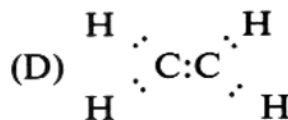
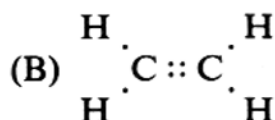
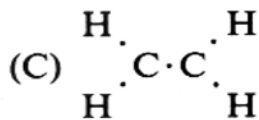
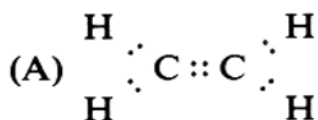
9. _____

10. Which compound is an ester?

- (A) CH_3COOH (C) $\text{CH}_3\text{COOCH}_3$
(B) CH_3CHO (D) CH_3COCH_3

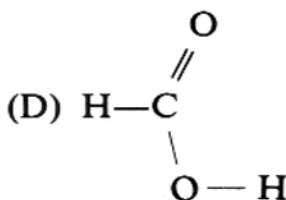
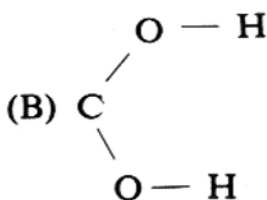
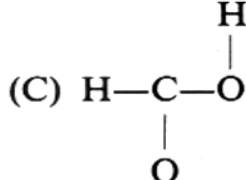
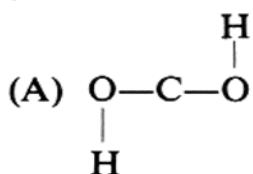
10. _____

11. Which is the correct electron-dot diagram for ethene, C_2H_4 ?



11. _____

12. If a compound has a molecular formula of CH_2O_2 , then its structural formula must be



12. _____

13. What is the total number of OH groups in a molecule of glycerol?

- (A) 1 (B) 2 (C) 3 (D) 4

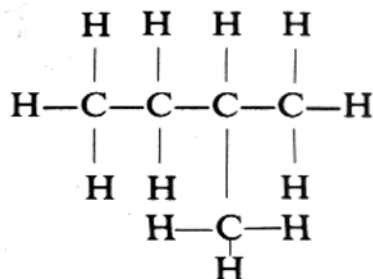
13. _____

14. The formula of methanoic acid is

- (A) HCHO (C) CH_3OH
(B) HCOOH (D) HCOOCH_3

14. _____

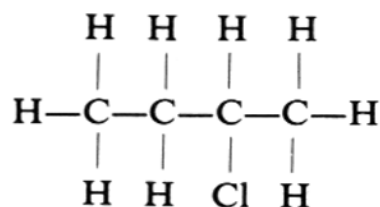
15. What is the correct IUPAC name of the compound represented by the following structural formula?



- (A) *n*-pentane (C) methylbutane
(B) isobutane (D) *n*-butane

15. _____

16. What is the name of the compound below?



- (A) 1-chlorobutane (C) 3-chlorobutane
(B) 2-chlorobutane (D) 4-chlorobutane

16. _____

17. The general formula for the alkyne series is

- (A) C_nH_n (B) C_nH_{n-2} (C) C_nH_{2n} (D) C_nH_{2n-2}

17. _____

18. Which compound represents a member of the benzene series?

- (A) acetylene (B) ethylene (C) toluene (D) propene

18. _____

19. A toluene molecule differs from a benzene molecule in that the toluene molecule contains one additional carbon atom and

- (A) one additional hydrogen atom
(B) two additional hydrogen atoms
(C) three additional hydrogen atoms
(D) four additional hydrogen atoms

19. _____

20. Which is the first member of the alkyne series?

- (A) CH_2 (B) CH_4 (C) C_2H_2 (D) C_2H_4

20. _____

21. Double or triple covalent bonds are associated with compounds in the

- (A) alkane and alkene series (C) alkane and benzene series
(B) alkyne and alkane series (D) alkene and alkyne series

21. _____

22. Each member of the alkane series differs from the preceding member by one additional carbon atom and

- (A) 1 hydrogen atom (C) 3 hydrogen atoms
(B) 2 hydrogen atoms (D) 4 hydrogen atoms

22. _____

23. Which formula represents a member of the same homologous series as C_8H_{14} ?

- (A) C_3H_4 (B) C_3H_5 (C) C_3H_6 (D) C_3H_8

23. _____

24. Which is the general formula of the homologous series that contains the compound $CH_3CH_2CH_2CH_2CH=CH_2$?

- (A) C_nH_{2n+2} (C) C_nH_{2n-2}
(B) C_nH_{2n} (D) C_nH_{2n-6}

24. _____

25. Which formula represents a member of the alkene series?

- (A) C_3H_6 (B) C_2H_6 (C) C_2H_2 (D) C_6H_6

25. _____

26. Which is the third member of the alkene series?

- (A) propane (B) propene (C) butane (D) butene

26. _____

27. What is the total number of covalent bonds in a molecule of ethane?

- (A) 6 (B) 2 (C) 7 (D) 4

27. _____

28. As the molecular mass of the compounds of the alkane series increases, their boiling point

- (A) decreases (B) increases (C) remains the same

28. _____

29. Which compound contains a triple bond?

- (A) methyl chloride (B) ethane (C) methanol (D) ethyne

29. _____

30. Which type of bonding generally characterizes organic compounds?

- (A) covalent (B) ionic (C) hydrogen (D) metallic

30. _____

31. An organic compound would most likely have

- (A) an ionic crystalline structure
- (B) high electrical conductivity in solution
- (C) a low melting point
- (D) a tendency to react rapidly

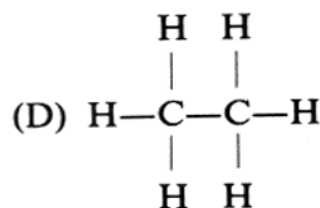
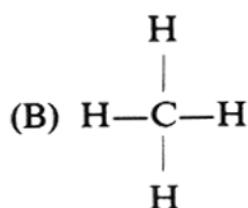
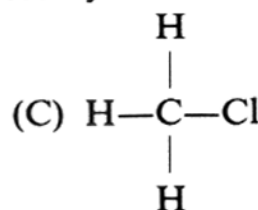
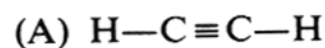
31. _____

32. Which formula represents a saturated hydrocarbon?

- (A) C_2H_2 (B) C_2H_4 (C) C_3H_6 (D) C_3H_8

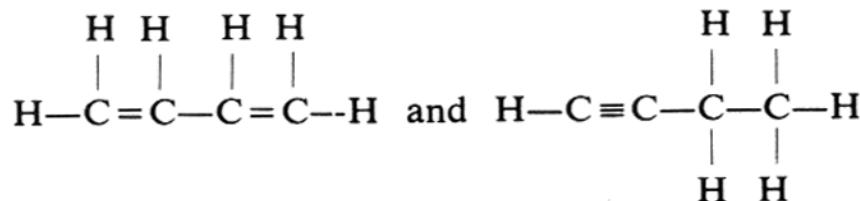
32. _____

33. Which formula represents an unsaturated hydrocarbon?



33. _____

34. The structural formulas



represent molecules that are both

- (A) halogen addition products
- (B) unsaturated hydrocarbons
- (C) members of the alkynes
- (D) isomers of butane

34. _____

35. Which formula represents an unsaturated hydrocarbon?

- (A) C_3H_8 (B) C_3H_7Cl (C) C_3H_6 (D) CCl_4

35. _____

36. Molecules of 1-propanol and 2-propanol have different

- (A) percentage compositions
- (B) molecular masses
- (C) molecular formulas
- (D) structural formulas

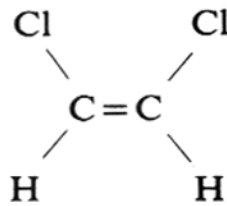
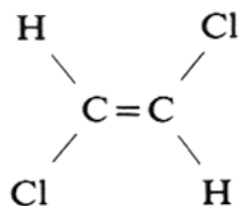
36. _____

37. Which compound is an isomer of CH_3COOH ?

- (A) $HCOOCH_3$ (B) CH_3CH_2OH (C) CH_3CH_2COOH (D) CH_3COOCH_3

37. _____

38. What term is used to describe the relationship between these two forms of dichloroethene?



- (A) isotopes (B) isomers (C) isotones (D) allotropes

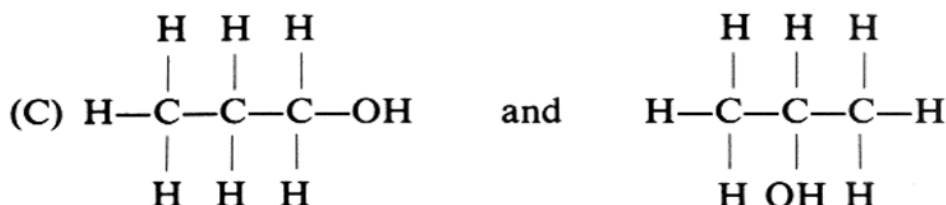
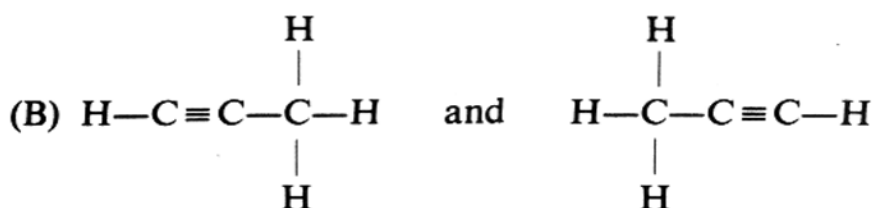
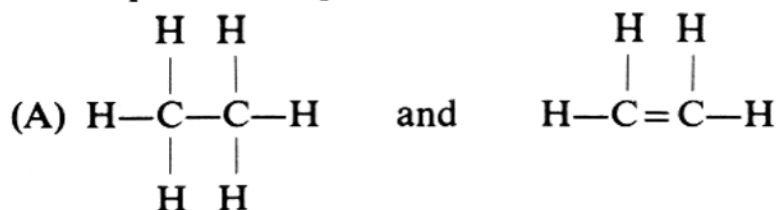
38. _____

39. Which is an isomer of 2-chloropropane?

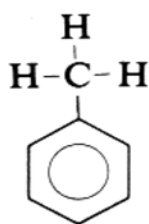
- (A) butane (B) propane (C) 1-chlorobutane (D) 1-chloropropane

39. _____

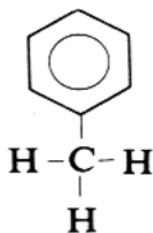
40. Which pair of compounds illustrates isomerism?



(D)



and



40. _____

41. The isomers of propanol differ in

- (A) the number of carbon atoms
(B) molecular mass
(C) the arrangement of the carbon atoms

41. _____

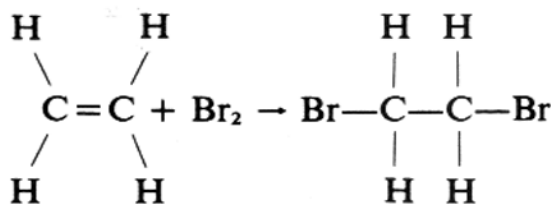
42. Which compound will react with CH_3COOH to form the ester methyl ethanoate?

- (A) CH_3OCH_3 (C) CH_3OH
(B) CH_3COCH_3 (D) CH_3COOH

42. _____

43. The reaction in the equation below is an example of

- (A) substitution (C) polymerization
(B) hydrogenation (D) addition



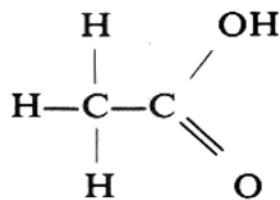
43. _____

44. Which reaction produces ethyl alcohol as one of the principal products?

- (A) an esterification reaction (C) a saponification reaction
(B) a neutralization reaction (D) a fermentation reaction

44. _____

45. Which equation does *not* represent a substitution reaction?
 (A) $\text{CH}_4 + \text{Cl}_2 \rightarrow \text{CH}_3\text{Cl} + \text{HCl}$
 (B) $\text{CH}_2\text{Cl}_2 + \text{Cl}_2 \rightarrow \text{CHCl}_3 + \text{HCl}$
 (C) $\text{C}_2\text{H}_4 + \text{Cl}_2 \rightarrow \text{C}_2\text{H}_4\text{Cl}_2$
 (D) $\text{CCl}_4 + 2\text{HF} \rightarrow \text{CCl}_2\text{F}_2 + 2\text{HCl}$
46. A mixture of ethanoic (acetic) acid and ethanol (ethyl alcohol) is heated in the presence of concentrated sulfuric acid. The organic product formed is
 (A) $\text{CH}_3\text{COOC}_2\text{H}_5$ (C) $\text{CH}_3\text{COC}_2\text{H}_5$
 (B) $\text{CH}_3\text{COC}_2\text{H}_5\text{OH}$ (D) $\text{C}_2\text{H}_5\text{CH}_3\text{COOH}$
47. Which equation represents an esterification reaction?
 (A) $\text{C}_6\text{H}_{12}\text{O}_6 \rightarrow 2\text{C}_2\text{H}_5\text{OH} + 2\text{CO}_2$
 (B) $\text{C}_5\text{H}_{10} + \text{H}_2 \rightarrow \text{C}_5\text{H}_{12}$
 (C) $\text{C}_3\text{H}_8 + \text{Cl}_2 \rightarrow \text{C}_3\text{H}_7\text{Cl} + \text{HCl}$
 (D) $\text{HCOOH} + \text{CH}_3\text{OH} \rightarrow \text{HCOOCH}_3 + \text{HOH}$
48. Which compound reacts with ethanol, $\text{C}_2\text{H}_5\text{OH}$, and produces the ester ethyl acetate, $\text{CH}_3\text{COOC}_2\text{H}_5$?
 (A) CH_3COOH (C) CH_3OCH_3
 (B) CH_3CHO (D) $\text{CH}_3\text{CH}_2\text{Cl}$
49. A reaction between an acid and alcohol produces an ester and
 (A) carbon dioxide (C) glycerol
 (B) water (D) ethanol
50. The complete combustion of ethane, C_2H_6 , produces
 (A) $\text{C}_2\text{H}_5\text{OH}$ (C) CO_2 and H_2
 (B) CH_3COOH (D) CO_2 and H_2O
51. By which process is ethanol, $\text{CH}_3\text{CH}_2\text{OH}$, converted to acetic acid, CH_3COOH ?
 (A) neutralization (C) oxidation
 (B) polymerization (D) reduction
52. What is the total number of carbon atoms in a molecule of 2,2-dimethylpropane?
 (A) 5 (B) 2 (C) 3 (D) 4
53. What is the total number of unshared valence electrons in all atoms of the methanol molecule, CH_3OH ?
 (A) 2 (B) 4 (C) 14 (D) 18
54. The structural formula of CH_3COOH is shown below.



When CH_3COOH ionizes, which atom is donated to H_2O ?

- (A) H bonded to C (C) O double bonded to C
 (B) H bonded to O (D) O single bonded to C
55. Which process is used in the petroleum refining process to convert large molecules into smaller molecules?
 (A) cracking
 (B) fermentation
 (C) neutralization
 (D) hydrogenation

45. _____

46. _____

47. _____

48. _____

49. _____

50. _____

51. _____

52. _____

53. _____

54. _____

55. _____

56. Which kind of reaction proceeds at the greatest rate?

- (A) esterification
- (B) substitution
- (C) dehydration
- (D) neutralization

56. _____

57. Which kind of organic compound is least soluble in water?

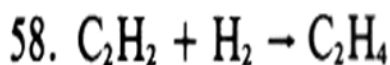
- (A) alcohol (B) aldehyde (C) alkane (D) acid

57. _____

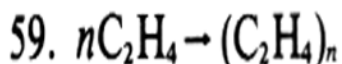
For each question in 58-60, select from the list the process most clearly associated with the equation and write its letter in the space at the right.

Processes

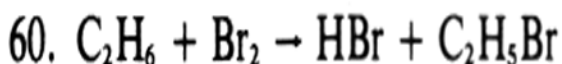
- (A) polymerization
- (B) hydrogenation
- (C) saponification
- (D) substitution



58. _____



59. _____



60. _____